AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

Claims 1-79 (canceled)

80. (currently amended) A radiation sensor module comprising:

a radiation detector made of a room temperature-operable, solid state semiconductor detection material capable of detecting gamma-ray photons and/or neutrons, and pixelated into a plurality of small pixel effect type pixels wherein pixels located in regions of the detection material having imperfections are individually disabled to enhance detector performance and high spectral resolution;

a temperature sensor capable of measuring the temperature of said detection material; and

means for adjusting the overall gain of the detection material as a function of time based on the temperature measured by said temperature sensor, to improve spectral resolution of said radiation detector.

81. (previously presented) The radiation sensor module of claim 80,

further comprising a readout having a plurality of channels connected to the pixels for electronically processing detection data obtained therefrom.

82. (previously presented) The radiation sensor module as in claim 81,

wherein the plurality of channels of said readout are connected only to the pixels in regions without imperfections.

Claims 83 and 84 (canceled)

85. (previously presented) The radiation sensor module as in claim 81,

further comprising an interface board, and

wherein the readout is an ASIC readout chip mounted on the interface board together with said radiation detector, with the ASIC readout chip and said radiation detector connected to each other by interconnects on the interface board.

86. (previously presented) The radiation sensor module as in claim 85,

wherein said ASIC readout chip is a VLSI readout chip bonded to the pixels of said detection material.

87. (previously presented) The radiation sensor module as in claim 80,

further comprising data processing means for excluding from analysis detection data obtained from the pixels in said regions having imperfections.

88. (previously presented) The radiation sensor module as in claim 87,

wherein said data processing means includes means for setting a level of inclusion/exclusion in analysis of detection data obtained from the pixels in said regions with imperfections to provide either higher resolution or higher efficiency.

Claims 89-91 (canceled)

92. (currently amended) ~~The~~ A radiation sensor module ~~as in claim 91,~~ comprising:

a radiation detector made of a room temperature-operable, solid state semiconductor detection material capable of detecting gamma-ray photons and/or neutrons, and pixelated into a plurality of small pixel effect type pixels wherein pixels located in regions of the detection material having imperfections are individually disabled to enhance detector performance and high spectral resolution;

means for adjusting the gain of each pixel to correct variations in detection material properties across the pixels of the detection material to further enhance spectral resolution; and

~~further comprising~~ a temperature sensor capable of measuring the temperature of each of said plurality of pixels, wherein adjustments made by said means for adjusting the gain of each pixel are based on variations of the temperature across the pixels of said detection material determined by said temperature sensor.

93. (canceled)

94. (previously presented) The radiation sensor module as in claim 80,

wherein said radiation detection material is chosen from the group consisting of cadmium zinc telluride, cadmium telluride, mercuric iodide, lead iodide, and aluminum antimonide.

95. (previously presented) The radiation sensor module as in claim 80,

wherein said radiation detection material is a commercial-grade material having low spectral resolution when operated as a single-crystal detector.

96. (currently amended) A radiation detection system comprising:

communications means for communicating over a communications network, said communications means including means for automatically transmitting the detection data without input from a user; and

a radiation sensor module operably connected to said communications means for transmitting detection data over said communications network, said radiation sensor module including a radiation detector made of a room temperature-operable, solid state semiconductor detection material capable of detecting gamma-ray photons and/or neutrons, and pixelated into a plurality of small pixel effect type pixels wherein pixels located in regions of the detection material having imperfections are individually disabled to enhance detector performance and high spectral resolution.

97. (previously presented) The radiation detection system as in claim 96,

wherein said communications means and said radiation sensor module are two separate modules.

98. (previously presented) The radiation detection system as in claim 97,

wherein said communications means and said radiation sensor module are operably connected by wires.

99. (previously presented) The radiation detection system as in claim 97,

wherein said communications means and said radiation sensor module are operably connected via a wireless link.

100. (previously presented) The radiation detection system as in claim 97,

wherein said radiation sensor module is attachable to an object independent of said communications means.

Claim 101 (canceled)

102. (currently amended) The radiation detection system as in claim ~~101~~ 96,

wherein the automatic transmission of the detection data is in real time.

103. (currently amended) ~~The~~ A radiation detection system ~~as in claim 96,~~ comprising:

communications means for communicating over a communications network, ~~wherein~~ said communications means ~~includes~~ including means for communicating with a data server of a central monitoring system over said communications network, for transmitting detection data to said data server; and

a radiation sensor module operably connected to said communications means for transmitting detection data over said communications network, said radiation sensor module including a radiation detector made of a room temperature-operable, solid state semiconductor detection material capable of detecting gamma-ray photons and/or neutrons, and pixelated into a plurality of small pixel effect type pixels wherein pixels located in regions of the detection material having imperfections are individually disabled to enhance detector performance and high spectral resolution.

104. (previously presented) The radiation detection system as in claim 103,

wherein said communications means includes means for automatically transmitting the detection data to the data server of said central monitoring system without input from a user.

105. (previously presented) The radiation detection system as in claim 104,

wherein the automatic transmission of the detection data is in real time.

106. (previously presented) The radiation detection system as in claim 96,

further comprising means for analyzing detection data obtained by said radiation sensor module.

107. (previously presented) The radiation detection system as in claim 96,

further comprising means for displaying detection data obtained by said radiation sensor module.

108. (previously presented) The radiation detection system as in claim 96,

wherein said communications means is a mobile wireless communications device.

109. (previously presented) The radiation detection system as in claim 96,

wherein the radiation sensor module further comprises a readout having a plurality of channels connected to the pixels for electronically processing detection data obtained therefrom.

110. (previously presented) The radiation detection system as in claim 109,

wherein the pixels located in said regions having imperfections are individually disabled by connecting the plurality of channels of said readout only to the pixels in regions without imperfections.

Claims 111 and 112 (canceled)

113. (previously presented) The radiation detection system as in claim 109,

wherein the radiation sensor module further comprises an interface board, and

wherein the readout is an ASIC readout chip mounted on the interface board together with said radiation detector, with the ASIC readout chip and said radiation detector connected to each other by interconnects on the interface board.

114. (previously presented) The radiation detection system as in claim 113,

wherein said ASIC readout chip is a VLSI readout chip bonded to the pixels of said detection material.

115. (previously presented) The radiation detection system as in claim 96,

wherein the radiation sensor module further comprises data processing means for excluding from analysis detection data obtained from the pixels in said regions having imperfections.

116. (previously presented) The radiation detection system as in claim 115,

wherein said data processing means includes means for setting a level of inclusion/exclusion in analysis of detection data obtained from the pixels in said regions with imperfections to provide either higher resolution or higher efficiency.

Claims 117-119 (canceled)

120. (currently amended) ~~The~~ A radiation detection system ~~as in claim 119,~~ comprising:

communications means for communicating over a communications network;

a radiation sensor module operably connected to said communications means for transmitting detection data over said communications network, said radiation sensor module including a radiation detector made of a room temperature-operable, solid state semiconductor detection material capable of detecting gamma-ray photons and/or neutrons, and pixelated into a plurality of small pixel effect type pixels wherein pixels located in regions of the detection material having imperfections are individually disabled to enhance detector performance and high spectral resolution;

means for adjusting the gain of each pixel to correct variations in detection material properties across the pixels of the detection material to further enhance spectral resolution; and

~~wherein the radiation sensor module further comprises~~ a temperature sensor capable of measuring the temperature of each of said plurality of pixels, wherein adjustments made by said means for adjusting the gain of each pixel are based on variations of the temperature across the pixels of said detection material determined by said temperature sensor.

121. (currently amended) ~~The~~ A radiation detection system ~~as in claim 96,~~ comprising:

communications means for communicating over a communications network;

a radiation sensor module operably connected to said communications means for transmitting detection data over said communications network, said radiation sensor module including a radiation detector made of a room temperature-operable, solid state semiconductor detection material capable of detecting gamma-ray photons and/or neutrons, and pixelated into a plurality of small pixel effect type pixels wherein pixels located in regions of the detection material having imperfections are individually disabled to enhance detector performance and high spectral resolution;

~~wherein the radiation sensor module further comprises~~ a temperature sensor capable of measuring the temperature of said detection material; and

means for adjusting the overall gain of the detection material as a function of time based on the temperature measured by said temperature sensor, to improve spectral resolution of said radiation detector.

122. (previously presented) The radiation detection system as in claim 96,

wherein said radiation detection material is chosen from the group consisting of cadmium zinc telluride, cadmium telluride, mercuric iodide, lead iodide, and aluminum antimonide.

123. (previously presented) The radiation detection system as in claim 96,

wherein said radiation detection material is a commercial-grade material having low spectral resolution when operated as a single-crystal detector.

124. (new) A radiation sensor module comprising:

a radiation detector made of a room temperature-operable, solid state semiconductor detection material capable of detecting gamma-ray photons and/or neutrons, and pixelated into a plurality of small pixel effect type pixels wherein pixels located in regions of the detection material having imperfections are individually disabled to enhance detector performance and high spectral resolution; and

data processing means for excluding from analysis detection data obtained from the pixels in said regions having imperfections, said data processing means including means for setting a level of inclusion/exclusion in analysis of detection data obtained from the pixels in said regions with imperfections to provide either higher resolution or higher efficiency.